

COWLITZ RIVER OLD MOUTH

Abstract

Sediment was sampled at four locations in the shoal at River Mile (RM) 0.0 in the Cowlitz River Old Mouth and was analyzed for Tier I physical parameters to determine if it is acceptable for unconfined in-water disposal. Although the physical analysis reveals a substantial fraction of the sediment to be fine-grained, particle analysis and field testing reveal negligible amounts of clay, plastic silt, or organic silt fractions in the samples. Sand is the predominate particle size, comprising over 60 percent of all four samples. The site is customarily dredged semiannually using an agitation-type dredge that moves the sediment to deeper water. The sediment from this location is acceptable for unconfined in-water disposal.

Introduction

1. The Cowlitz River Old Mouth is located at RM 67.7 on the Columbia River mainstem on the north side of the river at Longview, WA (See Figure 1.). The Old Mouth site is no longer an active component of the Cowlitz River drainage and serves as a port access channel for log handling and rafting operations in the Port of Longview. The authorized channel is 150 feet wide and 8 feet deep and extends from deep water in the Columbia River to Old Mouth RM 0.7. The Cowlitz River active channel is separated from Old Mouth by a narrow peninsula which ends in a rock groin in the main channel of the Columbia. The groin trains flows from the Cowlitz River, Carrols Channel on the Columbia and the Columbia mainstem away from the Cowlitz Old Mouth, but sediment tends to eddy around the end of the groin forming a shoal in the Old Mouth. Shoaling, due to a more or less continual influx of sediment from the Cowlitz, Carrols Channel, and the Columbia decreases channel depths here from the authorized 8-foot depth, to 4 or 5 feet. Because deeper water is nearby and the bottom has a relatively steep gradient from the Old Mouth to the Columbia, removal of the shoal is usually accomplished by agitation-type dredging equipment. The agitation dredge directs sediment washed from the shoal into the Columbia where the current transports the materials downstream.
2. Previous investigations carried out at this location show the sediments to be medium-grained sands in the Old Mouth channel, grading upstream to medium-grained silts at the upper end of the channel at Old Mouth RM 0.7. Volatile solids, a measure of the organic fraction of the sediment, similarly ranged from 0.3 percent by weight at the mouth to 2.2 percent at RM 0.7. Sediment in the main channel of the Columbia near Old Mouth is medium to coarse-grained sands, and volatile solids are usually less than 0.1 percent by weight. Sediment from the shoal at the Cowlitz Old Mouth has been found by previous studies to have a close resemblance to Columbia River sediment, which in this reach is dominated by relatively coarse-grained sand and silt-sized volcanic ash and rock flour derived from recently mobilized Mt. St. Helens volcanic sediments. Outflows through the Old Mouth channel are seasonal and are

controlled by a head gate which when opened, provides only enough flow to mobilize very fine sediments. The sediment mobilizing effects of outflows through the head gate and tidal flux in the Old Mouth channel are probably about the same.

3. Based on the 1991 sediment quality investigation which showed only clean sediment at the Cowlitz River Old Mouth, sediment samples were subjected to Tier I physical analysis, but Tier II chemical analysis was not undertaken. Tier II chemical testing was done in 1991 on Old Mouth sediments because the Federal channel is near port and industrial activities.

Methods

4. Sediment samples were collected on 4 NOV 96 from a shoal spanning the extreme outer mouth of the project channel in the Old Mouth of the Cowlitz River. (See Figure 2.) Four samples were taken by box corer and placed in Zip-lock bags for transport to the Corps' Materials Laboratory in Troutdale, OR. Samples COM-BC-1 and COM-BC-2 were taken from the southerly side of the channel at the upstream and downstream edges of the shoal. Samples COM-BC-3 and -4 were similarly obtained from the northerly side of the channel. All four sediment samples underwent physical analysis which included density, void ratio, volatile solids, specific gravity, particle size classification (ASTM D2487) and particle shape classification.

Results/Discussion

5. Results of physical analysis are presented in Table 1. Raw data are on file at the Portland District, Corps of Engineers. Sampling locations are shown on Figure 2. The mean grain size of the bulk sediment samples is 0.17 mm which is classified as fine sand. The median grain size of the fine fraction of the samples is 0.02 mm, thus it classifies as a medium silt. No plastic or organic silts or clays were detected in either the laboratory or in the dispersion tests conducted in the field. During dispersion tests, water decanted from the samples cleared very rapidly, within one to three minutes. This indicates these sediments are relatively coarse and contain little or no colloidal material capable of adsorption of organic pollutants. In addition, at 1.2 percent or less, the volatile solids content, an indirect measure of organic constituents, is very low. This outcome is expected, since few fragments of vegetative debris were observed in the samples and none of the samples exhibited the characteristic odor or coloration typical of organic materials.
6. Another important feature of these sediments is the shape of the individual particles, which is dominated by angular grains. The conclusion drawn from the angular particle shape is that these sediments were transported a relatively short distance from a single source, indicating they are probably from the Cowlitz River which still carries a substantial volume of Mt. St. Helens eruption products in bedload and suspended sediments.

Recommendation

7. Sediments from the shoal at the downstream end of the Cowlitz River Old Mouth are acceptable for unconfined in-water disposal with no unacceptable environmental impacts expected.

TABLE 1

COWLITZ OLD MOUTH

Results of Dredge Test Analysis

<u>CENPD Sample No.</u>	<u>Resuspended Density, gm/L</u>	<u>Void Ratio</u>	<u>Volatile Solids, %</u>	<u>Specific Gravity</u>	<u>Soil Classification ASTM D2487</u>	<u>Particle Roundness Grading</u>
COM-BC-1	1812	1.083	0.5	2.692	SP-SM	Subangular-subrounded
COM-BC-2	1742	1.226	1.7	2.653	SM	Angular-subangular
COM-BC-3	1767	1.174	0.9	2.667	SP-SM	Angular-subangular
COM-BC-4	1731	1.273	2.0	2.662	SM	Angular-subangular

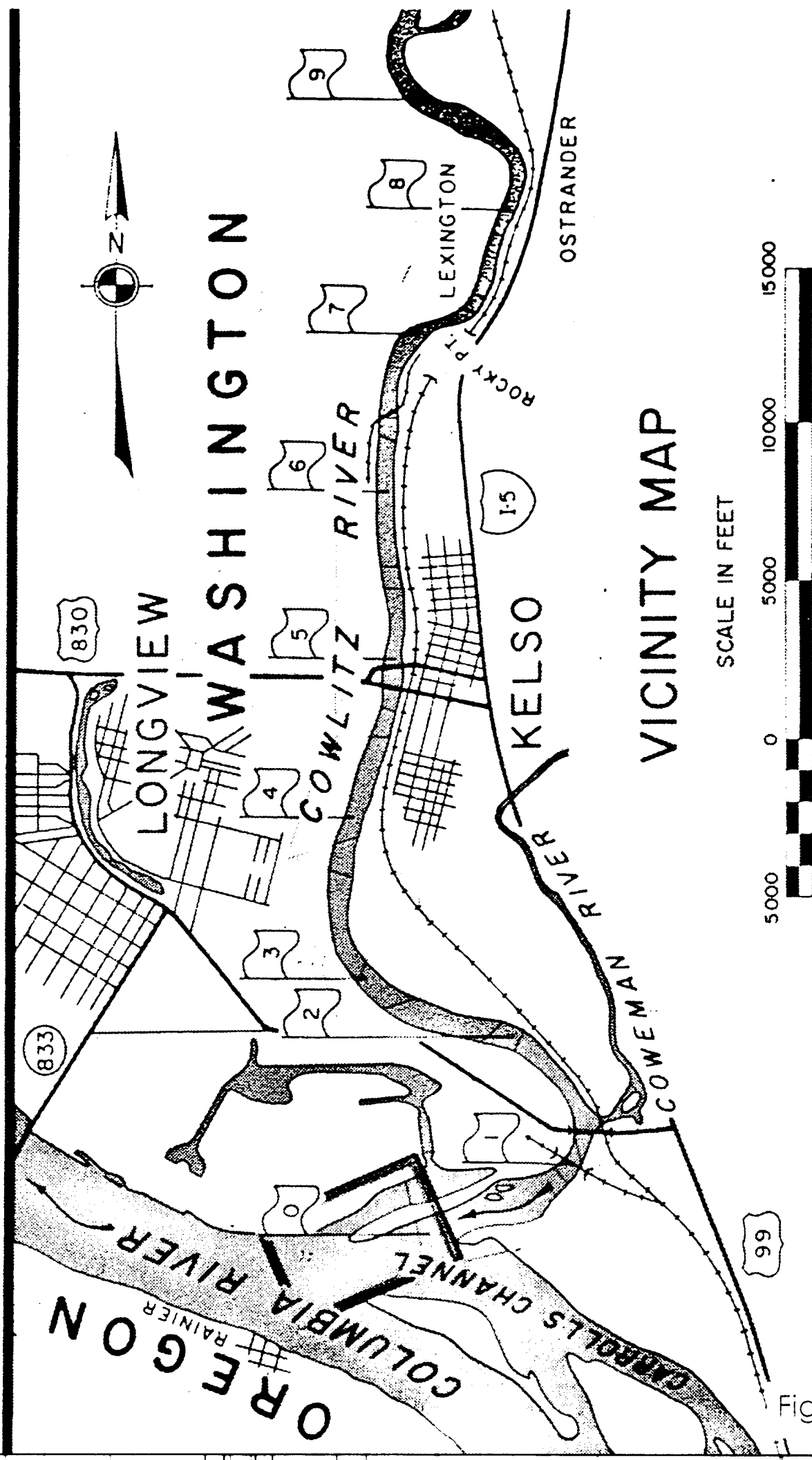


Figure 1

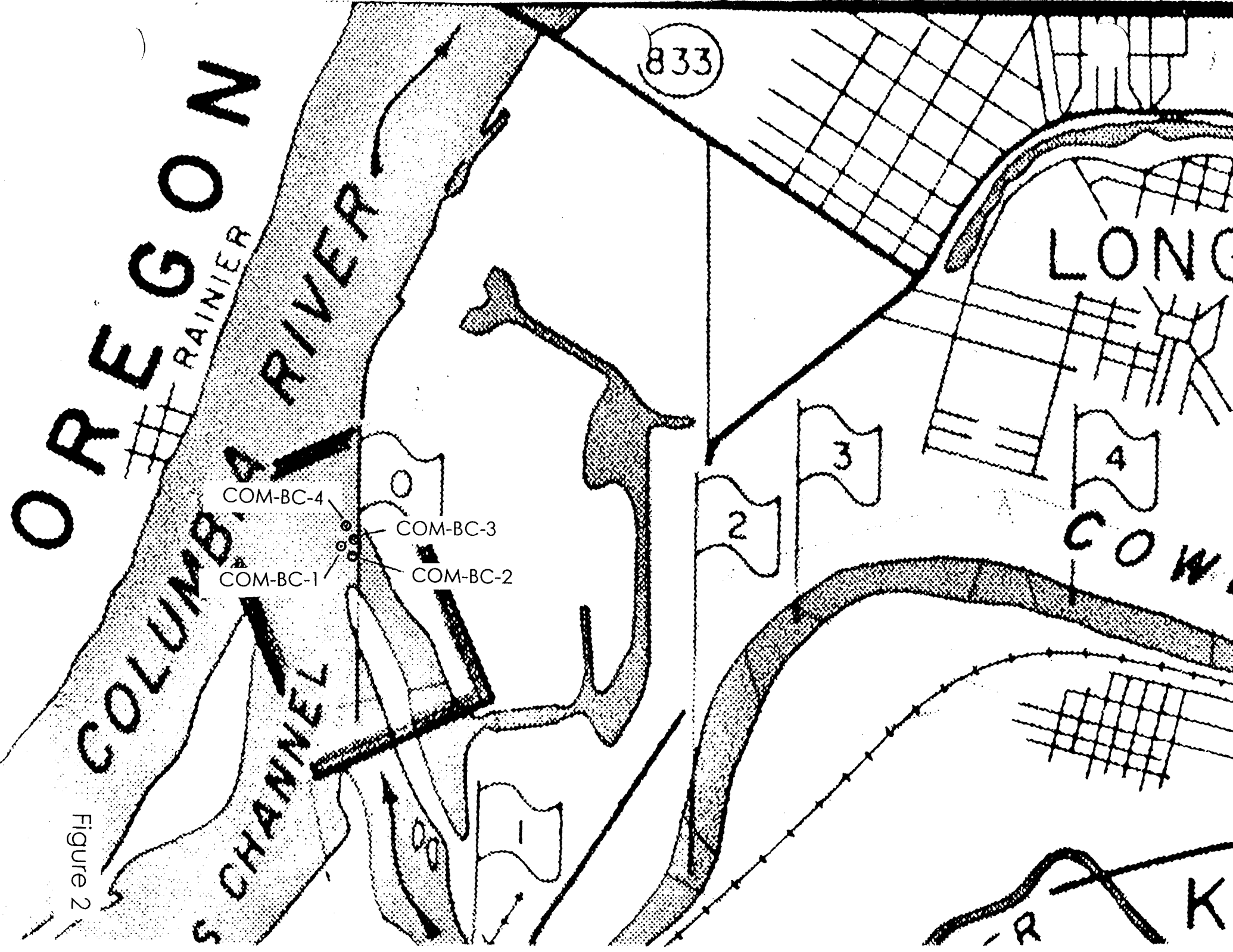


Figure 2